

No. 5.

FOR

THE AEROPLANE SPOTTER

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FOR THE ALERT

WEEKLY

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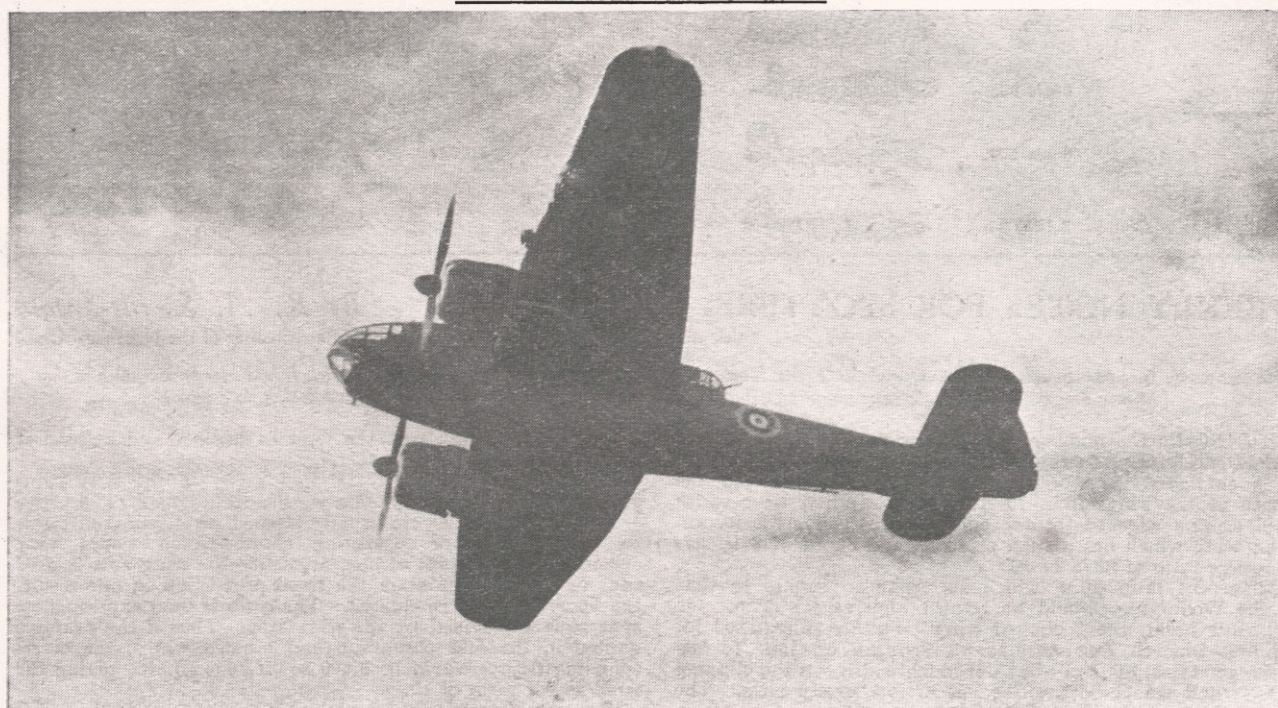
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Incorporating
THE HEARKERS' CLUB BULLETIN

Edited by PETER G. MASEFIELD

M.A. (Eng.) Cantab; A.F.R.Ae.S.
'Technical Editor of "THE AEROPLANE."



STRIKING POWER.—A BRISTOL BEAUFORT TORPEDO-BOMBER OF THE COASTAL COMMAND

TWO IMPORTANT points in training in the recognition of aircraft have arisen recently. The first concerns the number of aeroplanes which should be selected for preliminary study; the second the method of that study.

No spotter can call himself proficient until he can identify some 60 different aeroplanes with assurance. Yet this number appears to be too many for the real beginners to memorise at once. A selection of about 40 of the most common types of British and German aeroplanes likely to be seen over all parts of this country might be taken as a start. The selection can be narrowed down to this extent only if the student understands clearly that such a list is purely a foundation and that the budding spotter must pass on to a more comprehensive total of some 150 common types in all as soon as he has mastered the preliminaries. The spotter will find that as he progresses, the addition and recognition of new types becomes a relatively easy matter. We intend to publish in the near future a comprehensive list of British, American, German and Italian aeroplanes divided into classes for the most common, the not so common and the more rarely seen types.

The subject of instruction is as difficult as that of selection. A method widely used is one of recognition by sequence based on memory of the word WEFT, representing Wings, Engines, Fuselage and Tail

respectively. Other instruction on the same general principle of memorising details is done with the words WET FUR to remind the spotter to look for Wings, Engines and Tail, Fuselage, Undercarriage and Radiator in that order.

These methods are doubtless excellent for instilling the essential elementary features into newcomers; they are too slow and clumsy for use when the man becomes more experienced—nor are they needed. Once a spotter has more than a superficial knowledge of an aeroplane he will not look for particular details in any definite order but will recognise the aeroplane by its general composition and possibly confirm his conclusion by some prominent feature. Thus, although the wings are usually the outstanding feature for identification anyone who sees a Bombay approaching, for instance, would begin to base his identification rather on the under-carriage and fuselage. Aeroplanes are too mixed a breed for any generalisations to be laid down with finality and whether an aeroplane is a high, mid or low wing type is often indistinguishable at a distance.

Recognition is an exact science, as all those who have drawn attention to an occasional discrepancy in our published silhouettes are careful to point out—and rightly so. Yet the subject of aircraft recognition is still new and in process of evolution. Fortunately it exercises so much fascination that progress should be fast.


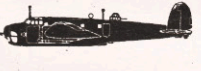










NEWS OF THE WEEK

Gilding the Italian Lily

THE REGIA AERONAUTICA is obviously not satisfied with the "appeal" of its aeroplanes. Therefore, to gild the lily or dust a fresh bloom on the peach, the old types which have become well known by their numbers are now given new and glamorous names. For instance, the sober

S.M.81 now rejoices in the title of Pipistrello, whereas the Junkers Ju 87B, now being built under licence as the Breda 201, is quaintly christened the Picchiattelli.

The types illustrated here are those which equip the bulk of the squadrons of the Regia Aeronautica.

FIGHTERS	Fiat	C.R.42.		Freccia.	Fiat	B.R.20.		Cicogna.
	Fiat	G.50.		Falcho.	Savoia-Marchetti	S.M.79		Sparviero.
	Macchi	C.200.		Saetta.	Savoia-Marchetti	S.M.81.		Pipistrello.
BOMBERS		Breda 88.		Lince.	Savoia-Marchetti	S.M.82.		Canguru.
		Breda 201.		Picchiattelli.	Cant	Z.506B.		Airone.
	Cant	Z.1007 bis.		Alcione.	Savoia-Marchetti	S.M.75.		Marsupiale.

WEEKLY NOTES FOR SPOTTERS—V (Aspect Ratio) *By R. A. Saville-Sneath* (Member of the Observer Corps and a Founder Member of the Harkers' Club)

(In last week's issue Mr. Saville-Sneath compared the Henley, Hurricane and Master. The second half of that article is held over to next week so that he may deal this week with the more urgent matter of "Aspect Ratio"—a subject which causes a great deal of confusion.)

JUDGING by the number of questions put to me at various times, no term confuses spotters more than "ASPECT RATIO." It is employed in expressing the relationship between the length of the wings from tip to tip (span) and their width from leading edge to trailing edge (chord). Thus a rectangular wing which has a span of 80 ft. and chord of 8 ft. has an aspect ratio of 80/8 or 10.

An aspect ratio of 9, which corresponds roughly to that of the Wellington, would be termed high aspect ratio. On the other hand, the "clipped wing" Spitfire, illustrated for the first time in THE AEROPLANE SPOTTER on Jan. 16 has lost a good deal of span—but not much width—in the clipping process and would be described as of low aspect ratio. The actual figure is slightly less than 8.

The term is divested of all its mystifying character if you apply it to everyday objects. I have frequently quoted the example of the dachshund as expressing high aspect ratio on four legs, whilst the thickset bulldog typifies low aspect ratio in the kennel world. There is no reason why a film fan should not describe Laurel and Hardy as high and low aspect

ratio—I don't think that the term is libellous and at least it makes for variety!

Obviously the simple calculation given in the first paragraph can only be used when a wing is rectangular. The wings of modern aeroplanes are usually tapered or elliptical in form, so that instead of measuring chord—which would vary according to the point of measurement—the wing area is used and, in order to maintain the same proportion in our result, the figure for span is squared. The ratio is then expressed by span squared divided by the wing area. Thus if the example quoted in the first paragraph had tapered wings, the corresponding figures would be 6,400 sq. ft./640 sq. ft., giving the same aspect ratio of 10.

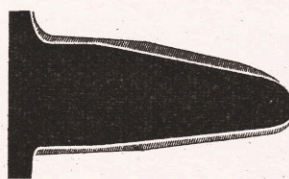
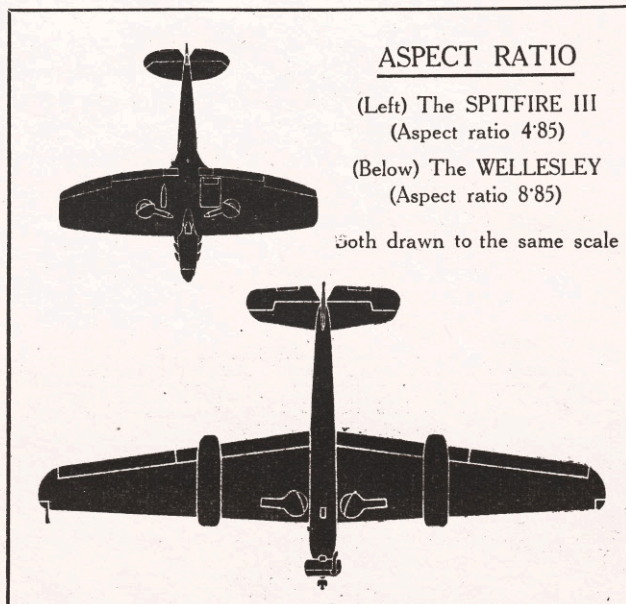
The second article in this series, in which I wrote "... if the plan view (of the He 113) is enlarged so that its span is the same as that of the Defiant, the chord is appreciably smaller" has raised an interesting case of conflict between the visual evidence of high aspect ratio, as seen in a wing which is clearly longer and narrower in proportion than that of the Defiant, and figures based upon the maker's published wing areas of each machine. The aspect ratio figures, added editorially to my original article, were only observed to be in conflict with recognition point (1) after the article had gone to press.

Last week's issue editorially repeated the figures showing the Defiant to have a slightly higher aspect ratio—according to the maker's own data—than that of the He 113, but the photograph published over that statement confirmed in a most striking manner—after making due allowance for slightly different angles of view—my original observation concerning the appreciably higher aspect ratio of the He 113!

The explanation of this discrepancy is probably to be found in the inaccuracy of published figures relating to wing area, particularly in the case of German types. In one recent case, seeking verification of wing dimensions of a German aeroplane I found that I had a choice of four different figures, the variations occurring, not in inches, but in feet!

EDITORIAL NOTE.—The attached silhouettes show the wing of the He 113 (black) compared with the wing of the Defiant (shaded) when both are reduced to the same span. They

confirm that the aspect ratio of the He 113 is slightly higher than that of the Defiant according to the silhouettes, although this is at variance with the makers' figures. We hope to track down this minor mystery and reconcile silhouette and figures within the next few weeks.

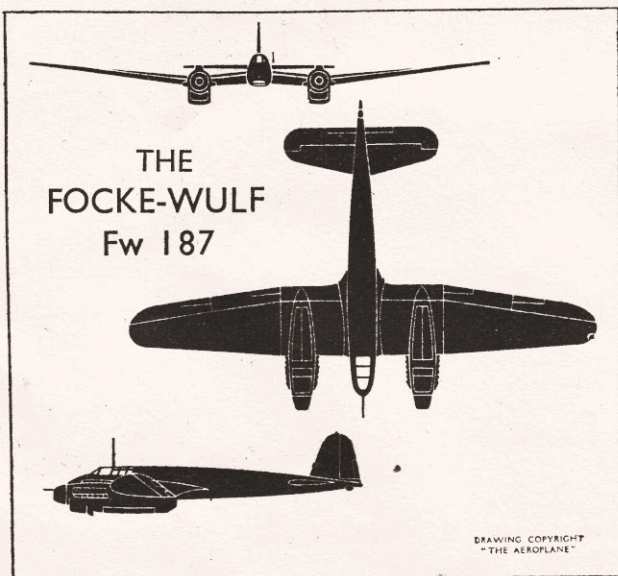
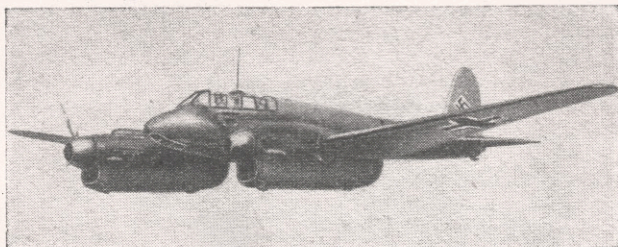


AIRCRAFT IN THE NEWS—V

THE FOCKE-WULF Fw 187—THE ZERSTÖRER

GERMANY has concentrated more on the two-motor two-seat fighter than has any other country. The Messerschmitt Me 110 is the best known example but the enemy is apparently pinning great hopes on the newer Focke-Wulf Fw 187 for his coming air offensive. Squadrons of these machines are now believed to be in France.

The Fw 187, which has the type name "Zerstörer" (Destroyer), is apparently built to much the same formula as our Westland Whirlwind, except that the Whirlwind is a single-seater and has less power.



Two 1,150 h.p. Mercedes Benz DB 601A liquid-cooled motors give the Fw 187 a top speed of 362 m.p.h. at 19,685 ft.

The Fw 187 is obviously inspired to some extent by the Me 110 which is built under licence by the Focke-Wulf concern. Some of the shortcomings of the Me 110 have been avoided, notably the structural weakness of the tail.

Forward armament is two cannon and four machine-guns—the same as that of the Me 110. The cannon are mounted under the short nose whereas the machine-guns are installed two on each side of the fuselage alongside the back cockpit where they are easily accessible to the second man. His function is solely that of loader and radio operator. There is no rearwards firing armament. The Fw 187 may be used for light bombing as well as for fighting and for that purpose there are three transparent panels in the floor of the cockpit.

DIMENSIONS.—Span, 50 ft. 6 ins.; length, 33 ft. 6 ins.; wing area 300 sq. ft.; aspect ratio, 8.6.

WEIGHT (approx.).—Loaded, 12,000 lb.

PERFORMANCE.—Max. speed, 362 m.p.h. at 19,685 ft.; initial climb, 3,450 ft. per min.; service ceiling, 38,940 ft.

POINTS OF RECOGNITION.—Slim fuselage. Short nose. Highly tapered low wings of high aspect ratio and with rounded tips, down-swept centre section and marked dihedral. Low slung motors projecting beyond nose. Single fin and rudder, the tailplane set low in front of the fin. The cockpit is flush with the top line of the fuselage.

CIVIL IDENTIFICATION—V

THE CONSOLIDATED MODEL 28-5 FLYING-BOAT—THE GUBA



ONE of the best-known flying-boats in the World, the Guba, was bought recently by the Ministry of Aircraft Production and is allotted to British Airways to carry mails and freight on the Lisbon service. The Guba is a civil version of the Consolidated Model 28-5 flying-boat which is in production for the R.A.F. as the Catalina. The Guba was formerly owned by Dr. Richard Archbold, an American explorer, and was used for research work in New Guinea. In 1939 it was chartered by

the Australian Government for Captain P. G. Taylor's survey flight of the Australia-Africa Reserve Route.

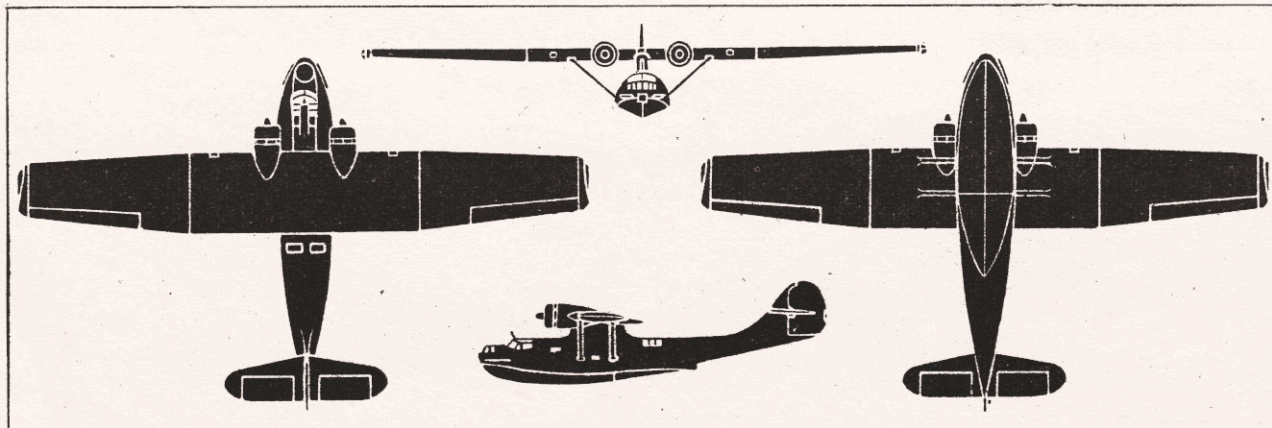
Powered by two 1,200 h.p. Pratt and Whitney Twin Wasp R-1830-S1C3-G motors, the Guba is a long-range high-wing braced monoplane with retractable wing-tip floats which form tips to the wings when retracted. It is of all-metal construction. There are no flaps. The Guba has comfortable living accommodation for a crew of six.

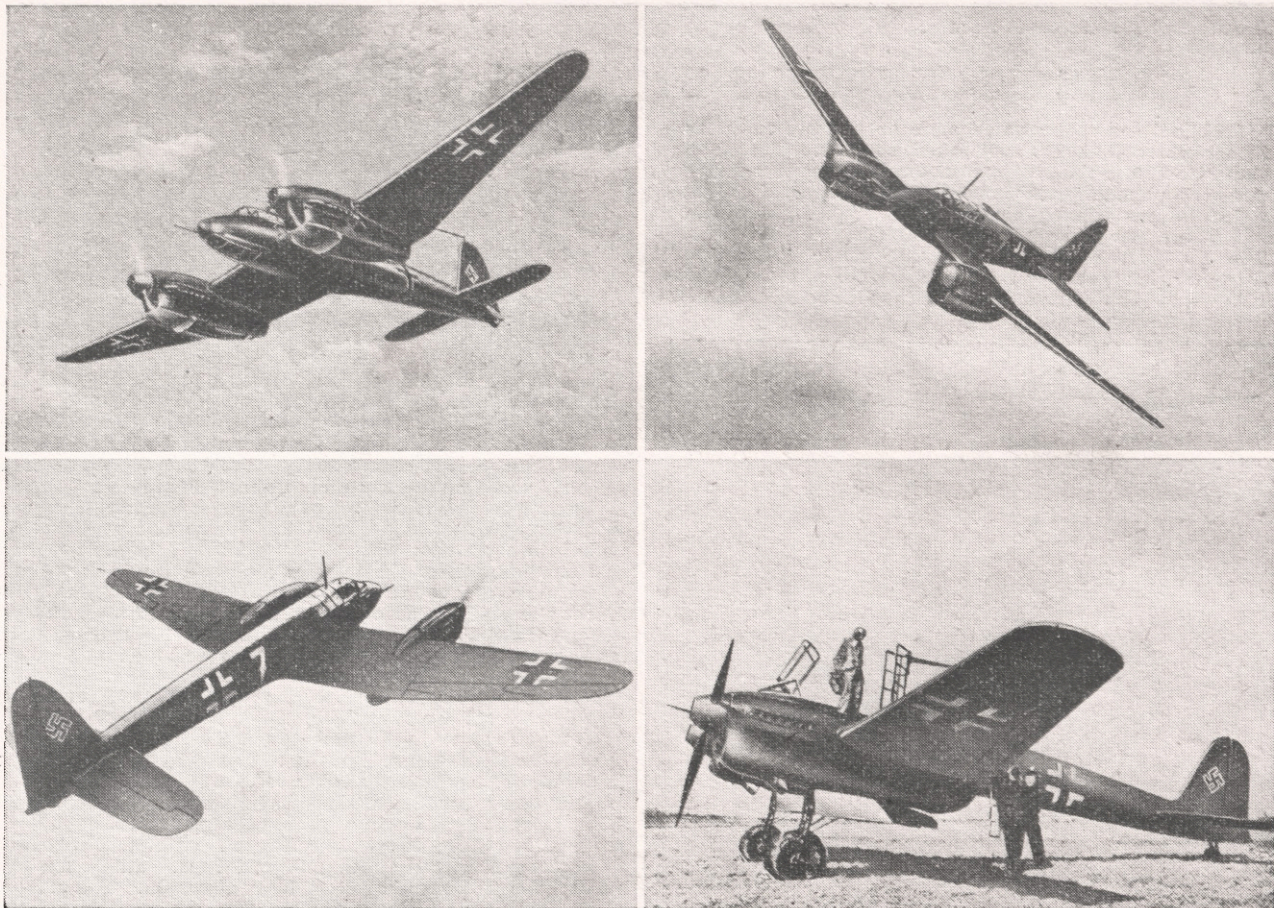
DIMENSIONS.—Span, 104 ft.; length, 65 ft. 1 in.; height, 18 ft. 6 ins.; wing area, 1,400 sq. ft.; aspect ratio, 7.7.

WEIGHTS.—Empty, 14,240 lb.; loaded, 27,080 lb.

PERFORMANCE.—Top speed, 190 m.p.h. at 10,500 ft.; range, 4,000 miles at 130 m.p.h.; initial climb, 1,100 ft. per min.; service ceiling, 25,200 ft.

POINTS OF RECOGNITION.—High wing monoplane, the centre section supported above the hull by a streamline superstructure and braced by two pairs of parallel streamline struts to the sides of the hull. Square-cut wing tips, straight leading edge, angular trailing edge. Radial motors mounted in the leading edge of the centre section. Single fin and rudder, the lower part of the fin integral with the hull and the tailplane placed high on the tail unit.





THE ZERSTÖRER.—The latest German two-motor fighter to go into service, the Focke-Wulf Fw 187 (two 1,150 h.p. Mercedes-Benz DB-601A motors). The top speed is 362 m.p.h. at 19,685 ft., the span 50 ft. 6 in. and the wing loading about 40 lb. per sq. ft. Armament comprises two fixed cannon and four machine-guns.

Aircraft Recognition

A BLACKBURN BOTHA reconnaissance bomber (two 930 h.p. Bristol Perseus Xa motors) and an Airspeed Oxford advanced trainer (two 375 h.p. Armstrong Siddeley Cheetah X motors) were last week's recognition tests.

The Botha can be identified in the view shown by its tall single fin and rudder, its high wing and by the characteristic curve of the under side of the fuselage. The pointed gun turret on top of the fuselage behind the wings is another point of recognition. In the plan view the most noticeable feature is the

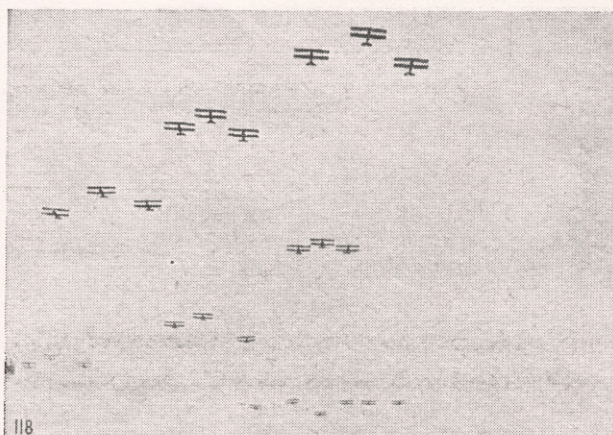


LAST WEEK'S PROBLEM—(Left) the Botha, and (right) the Oxford.

very sharp forward taper of the trailing edge on the outer sections of the wings.

The Airspeed Oxford, in the rather foggy view shown, is suggested rather than identified by the sharply tapered wings, the short fuselage which is stocky towards the nose and by its single fin and rudder. The two motors mounted close in to the nose tend to increase the suggestion of stuntedness in the side view, which makes the combina-

tion of fuselage stumpiness with the tapered wings of high aspect ratio all the more surprising in the plan view.



FOR IDENTIFICATION V—Two more photographs to give practice in the recognition of allied and enemy aeroplanes. What they are and notes on their characteristics will be published with two more photographs next week.

THE HEARKERS' CLUB

DIVIDING THE LABOUR

TIME and trouble will be saved if correspondents will address their letters as follows, and, when a reply is required, enclose a stamped addressed envelope:—

Re the formation and conduct of clubs, procedure at meetings and examinations: H. JAMES LOWINGS, Hon. Organising Secretary, The Observer Corps Club, 34, High Street, Guildford.

Re other secretarial matters, Certificates, etc., to:—R. O. DOWDESWELL, Hon. General Secretary, Rodboro Buildings, Bridge Street, Guildford.

Re finances, spoons, links, etc., to:—G. C. CLARKE, Hon. General Treasurer, 17, Onslow Street, Guildford.

Re loan of slides to:—R. A. SAVILLE-SNEATH, Hon. Librarian, "Glebe," Crossfield Place, Weybridge.

Re "The Bulletin," to:—PETER MASEFIELD, Hon. Editor, Observer Corps Club Bulletin, Bowling Green Lane, London, E.C.1.

Re local clubs, to the Hon. Secretaries:—

1. GUILDFORD.—R. O. Dowdeswell, Rodboro Buildings, Bridge Street, Guildford.

2. SHIRLEY.—J. C. Fleming, 42, Park Lane, Wallington, Surrey.

3. HENDON.—A. Laws, Elers Road, Ealing, W.13.

4. LIVERPOOL.—S. P. Sugden, 4, Bath Street, Waterloo, Liverpool.

5. EVESHAM.—F. Dobson, Farnham House, Broadway, Worcs.

6. CROWTHORNE.—L. M. Leakey, St. Lawrence, Crowthorne, Berks.

7. SOUTHEND.—E. H. McLean, 109, Broadway, Leigh-on-Sea.

8. ANGUS.—D. A. Gardner, M.A., "Tantallon," 51, Keptie Road, Arbroath, Angus, Scotland.

9. KENDAL.—C. E. Hoggarth, "Fairhaven," Kent Lea, Kendal, Westmorland.

10. LANGPORT.—R. T. Hawke-Genn, Earneshill, Curry Rivel, Somerset.

11. OTLEY.—F. D. Marshall, Caressa House, King Street, Leeds, 1.

12. CAMBRIDGE.—H. J. Rumsey, 29, Chesterfield Road, Cambridge.

13. BODMIN.—T. H. A. Truscott, "Polscoe," Launceston Road, Bodmin, Cornwall.

14. HOLYWELL.—F. G. Southworth, Victoria Square, Holywell.

15. WAREHAM.—Lieut.-Col. G. R. Raye, "Gardenfield," Compton Avenue, Parkstone, Dorset.

HEARKERS' CLUB No. 5 (EVESHAM)

Hon. Sec. F. Dobson, Farnham House, Broadway, Worcestershire

THE COMMITTEE regret they had to cancel the meeting which was to have been held on Sunday, Jan. 19, but this was because of circumstances over which we had no control. We did our best to notify everyone concerned, and hope no "Hardy Hearer" turned up, only to be disappointed.

Look out for news of revised dates in THE AEROPLANE SPOTTER.

HEARKERS' CLUB No. 9 (KENDAL)

Hon. Sec. C. E. Hoggarth, "Fairhaven," Kent Lea, Kendal.

THE second meeting of the Club was held in the Fleece Inn, Kendal, on Sunday, Jan. 12. There was an attendance of 52, an increase of 13 on our last meeting.

Invitations extended to Flookburgh, Backbarrow and Kirkby Lonsdale to join the Club had not been answered by Flookburgh and Backbarrow; Kirkby Lonsdale had declined the invitation.

A letter affiliating Harkers' Club No. 9 (Kendal) to the Harkers' Club was received from Mr. H. J. Lowings, Hon. Organising Secretary.

A competition with the aid of an epidiascope was held on the identification of aircraft. Photographs of 31 aeroplanes were projected at 20 sec. intervals. The winner was J. Studholme, Toc 2, with 30½; 2nd J. A. S. Jamieson, Toc 2, with 29½; and 3rd R. Hunt, Toc 2, with 28. Mr. A. T. Gates, Head Observer, Toc 2, and Competition Officer gave an interesting lecture on aircraft construction.

HEARKERS' CLUB No. 10 (LANGPORT)

Hon. Sec. R. T. Hawke-Genn, Durlston Court, Earnshill, Curry Rivel, Somerset.

THE A.G.O., the H.Os. and members of M1, L4 and Y1 met at Glastonbury on Jan. 19. About 36 were present from the three Posts. This very good attendance was mainly due to the almost unanimous support of the "home team," M1, who well deserved their remarkable success in the Competition.

Flight Lieut. Henstock, who travelled 60 miles to attend the meeting, brought with him a projector, an expert to work it, two most interesting and instructive films and some excellent models. His talk was most illuminating and helpful. We are indeed grateful to him.

At the request of the Council the 2nd Grade Test was postponed.

The following passed the 3rd Grade with 25 or more out of 31, 15 for the first time and 8 with "possibles":—

A. N. Hughes	L4 (31)	F. J. Checkley	M1 (30)
W. J. Crocker	M1 (31)	R. G. Phelps	M1 (30)
W. M. Davies	M1 (31)	R. Ribbons	M1 (30)
A. J. Low	M1 (31)	W. E. Wright	M1 (29)
H. R. Messem	M1 (31)	D. J. Bird	Y1 (27)
E. J. Seaman	M1 (31)	R. E. Checkley	M1 (27)
S. C. Webb	M1 (31)	E. J. Osborne	M1 (26)
R. T. Hawke-Genn	T4 (31)	C. V. Hill	Y1 (26)
A. T. Simms	M1 (30)	A. C. Cook	Y1 (26)

A vote of thanks and congratulations was passed to C. V. Hill (Y1) who made the epidiascope himself.

Future meetings will be held on the last Sunday of each month at 10.30 hrs., the next fixture being Glastonbury Cinema on Feb. 23.

BOURNE (Lincs.)

MEMBERS of Bourne (Lincs.) Observer Corps held a Supper on Jan. 13, and among those who attended were C. T. Hodgkinson (Head Observer), who presided, Mr. W. S. Liddall, M.P. for Lincoln, Wing Commander B. E. Embry, D.S.O., Squadron Leader C. F. Morice, M.C., and Capt. G. Holliday.

Speeches were afterwards made by the President and Squadron Leader Morice. The President said that though the Observer Corps appeared to be "nobody's baby" and had no uniform, they would carry on, knowing that they were doing their bit in the struggle for freedom. Squadron Leader Morice proposed the toast of the Observer Corps and said that the R.A.F. was proud of the men who, without publicity of any kind, had already won for themselves a place in history. Wing Commander Embry said that the work of the Observer Corps was much appreciated by the R.A.F. He thought that the question of uniform was a secondary one. What mattered was the man.

THE NEW CONSTITUTION

MOST Harkers know already of the change in name and constitution of the Harkers' Club which has now been approved by the Council and agreed to by the various branches. Details of the organisation of THE OBSERVER CORPS CLUB and its constitution will be published in THE AEROPLANE SPOTTER next week. The change has been made necessary by the growth of the Club throughout the British Isles.

FORTHCOMING EVENTS

Feb. 2.—Crowthorne.—Harkers' Club No. 6 (Crowthorne).—Talk by Controller, No. 4 Centre. Instructional talk by Mr. C. F. Andrews (4.N.3). Films. Tea. Grade III Examination. At Wellington College.—15.00 hrs.

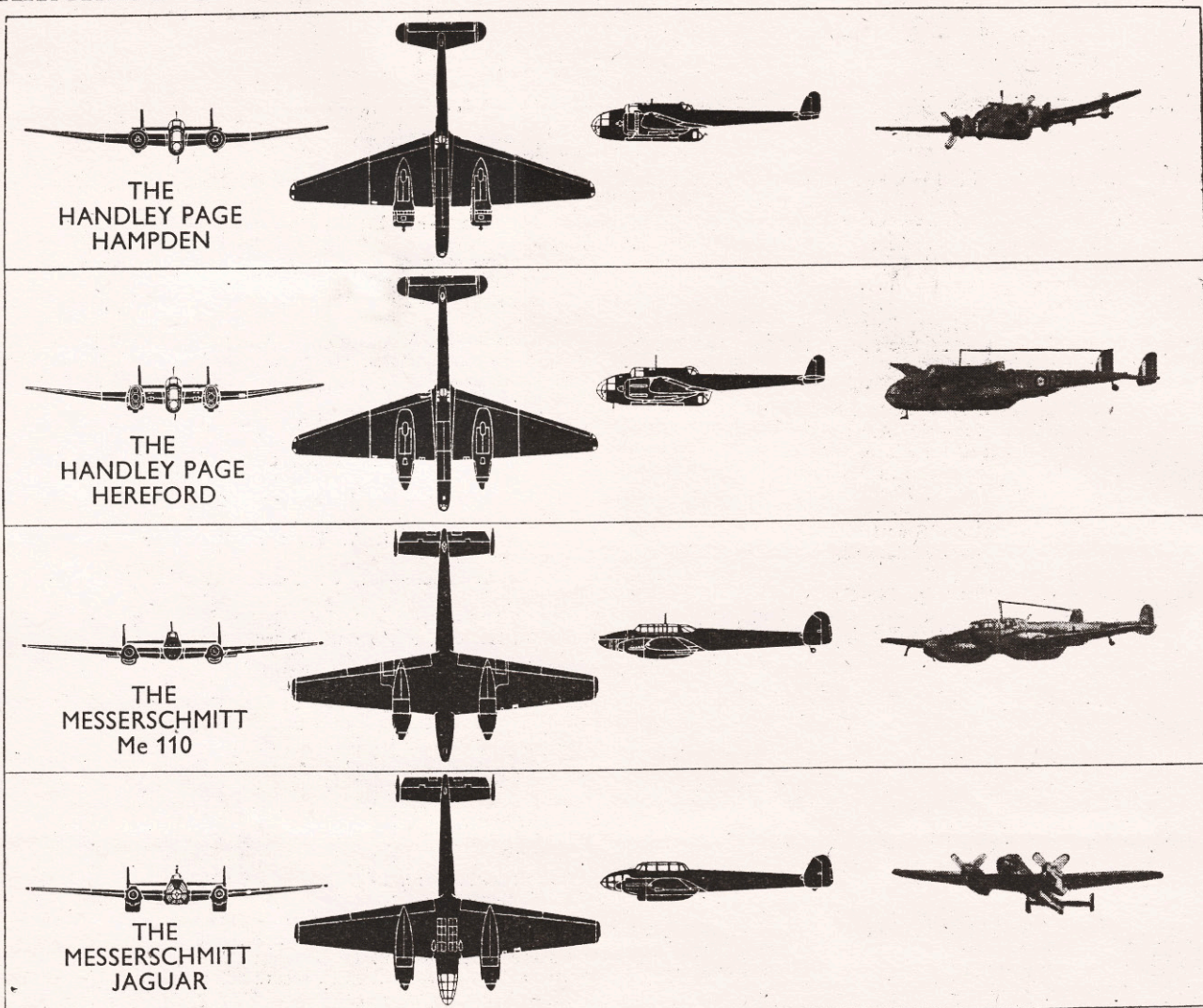
Feb. 2.—Southend.—Harkers' Club No. 7 (Southend).—Talk by R. A. Saville-Sneath on "Useful Mnemonics."

Feb. 2.—Harkers' Club No. 8 (Angus).—Display of identification films in Forfar Academy.—15.00 hrs.

Feb. 9.—Shirley.—Harkers' Club No. 2 (Shirley).—Talk by R. A. Saville-Sneath on "Cloud Formations in Relation to Height." Second Grade Test.—10.00 hrs.

Feb. 9.—Bishops Stortford.—Harkers' Club No. 3 (Hendon).—Talk by Peter Masefield on "The Evolution of the Single-seat Fighter 1913-1941," and by J. G. M. Miller on "New Types of Aeroplanes in the R.A.F.," at the Falcon Hotel.—10.00 hrs.

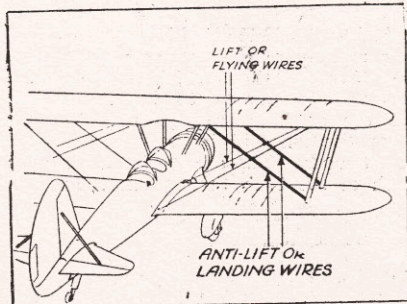
AIRCRAFT COMPARISON—V



VARIATIONS ON A THEME—The Handley Page Hampden and Hereford differ only in engines; the Hampden has Bristol Pegasus radials, the Hereford has Napier Dagger in-line motors. The Messerschmitt Jaguar bomber is derived from the Me 110 long-range fighter. The differences are in the width of fuselage, nose, radiators and tail wheel. Note square-cut wing tips. Handley Page and Messerschmitt tail units have led to confusion in the past.

THE SPOTTER'S GLOSSARY OF AERONAUTICAL TERMS

ANTI-LIFT WIRES.—Wires or cables, usually running from the top of the top centre section plane to the outer wing struts of a biplane, designed to resist forces opposite to the normal direction of lift. They are sometimes called "Landing Wires" because they help to support the weight of the wings on the ground. They are units of the bracing system of a biplane.



APERIODIC.—Non-oscillating. Applied, for example, to the needle of an instrument, usually a compass, which is so designed that, after a slight lag, it indicates the correct reading with no overswing.

A6

APRON.—A prepared area near the hangars on an aerodrome, usually made with a hard surface, designed to facilitate the manœuvring of aeroplanes on the ground.

ARRESTER GEAR.—Cables laid across the deck of an aircraft carrier to engage with the deck arrestor hook of a deck landing aeroplane to retard its run on alighting.

ARTIFICIAL HORIZON.—An instrument, operated by a gyroscope, devised to keep an indicator permanently parallel with the true horizon and thus show the pilot the attitude of his aeroplane when flying in cloud or bad visibility.

ASPECT RATIO.—The ratio of the span to the mean chord of an aerofoil; the ratio of the square of the span to the total area of an aerofoil. Determined by the formula

$$\frac{\text{Span} \times \text{Span}}{\text{Total wing area}}$$

for all aerofoils, tapered, elliptical, circular, rectangular or square. Aspect ratio is important in conveying the general plan form of a wing. It is also important to the structural engineer in building a wing and to the performance estimator in calculating

the rate of climb and ceiling of an aeroplane. Aspect ratio has an important bearing on the drag of a wing at low speeds high up. Aspect ratio varies between about 12 (high) and about 4 (low).

ATMOSPHERE.—The mass of air which surrounds the earth and rotates with it. International Standard Atmosphere is an imaginary condition of the atmosphere to which the performance of all aeroplanes is referred for exact comparison. It assumes at mean sea level:—Temperature 15 degrees C.; Pressure 1,013.2 millibars. The temperature is calculated to fall by 6.5 degrees C. for every 1,000 m. (3,281 ft.) of height from sea level to 11,000 m. (36,089 ft.) above sea level. At that height it is assumed to be constant at minus 56.5 degrees C.

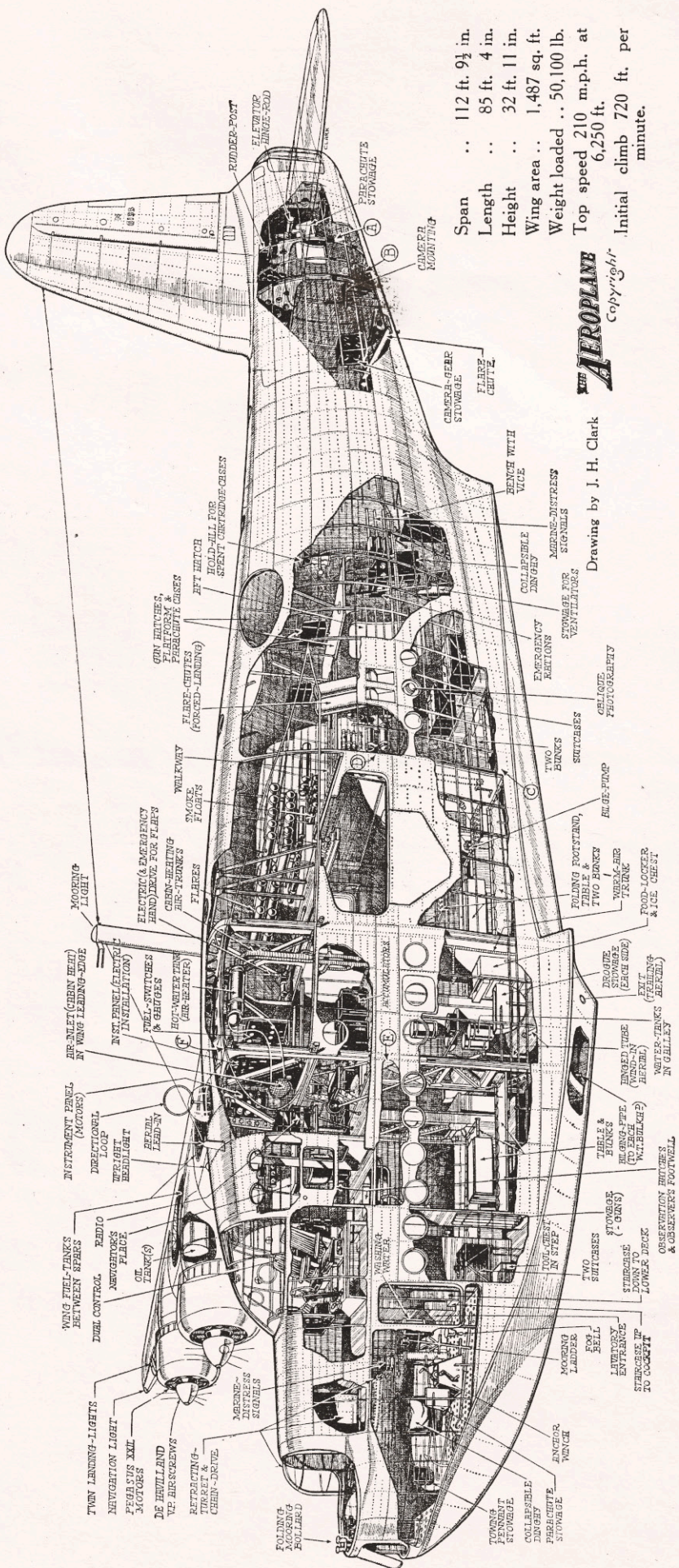
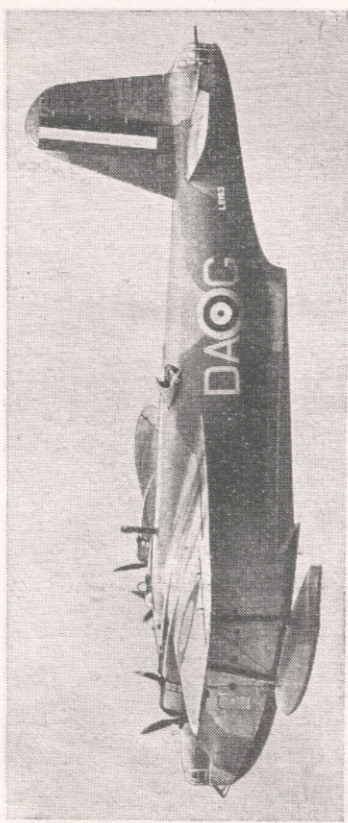
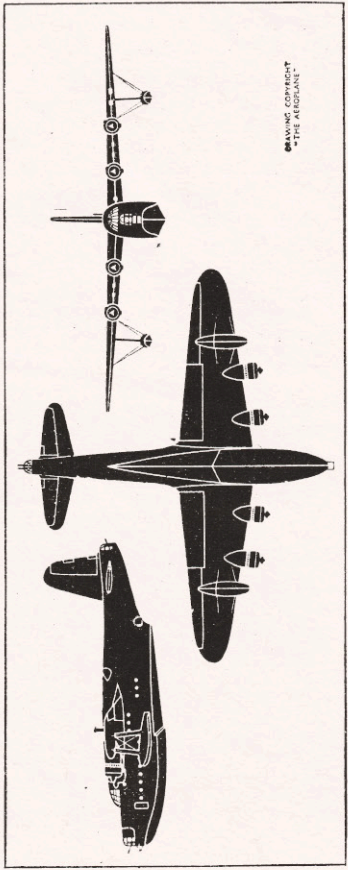
ATTITUDE (Flying).—The inclination of the axes of an aeroplane to the relative airstream.

(Ground).—The inclination of the axes of an aeroplane relative to the ground.

AUTOMATIC BOOST CONTROL.—A device which automatically regulates the boost pressure from the supercharger of an aero-motor so that a predetermined value is not exceeded.

(To be continued.)

THE SHORT SUNDERLAND General Reconnaissance Flying-Boat (Four 1,010 h.p. Bristol Pegasus XXII motors)

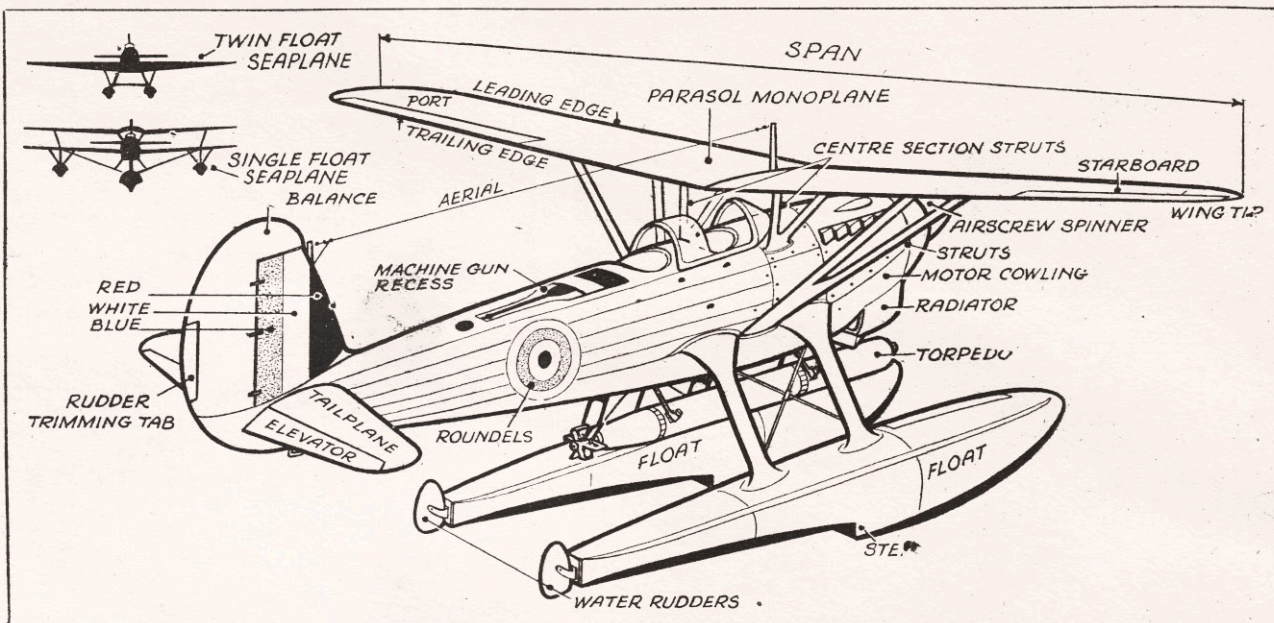


Span .. 112 ft. 9½ in.
Length .. 85 ft. 4 in.
Height .. 32 ft. 11 in.
Wing area .. 1,487 sq. ft.
Weight loaded .. 50,100 lb.
Top speed 210 m.p.h. at 6,250 ft.
Initial climb 720 ft. per minute.

THE AEROPLANE
Copyright

Drawing by J. H. Clark

BY THESE NAMES SHALL YE KNOW THEM



AERONAUTICAL TERMS—IV—The parts of a typical single-motor parasol monoplane twin-float seaplane.

Mental Aerobatics—V

GRIFFITHS, Priestley, Spencer, Stuart and Sneath flew four different types of aeroplane—among them German aeroplanes in British hands.

Griffiths looked back over his port wing as he banked round the aerodrome to watch Priestley's take-off.

Priestley adjusted his sun goggles inside his transparent cockpit and looked down between his feet to watch the ground receding beneath him.

Spencer and Stuart both retracted their wheels to turn through 90 degrees to lie flat in the wings.

Griffiths formatted on Spencer and watched Sneath in the

back seat raise his windscreen to approach for a landing.

Stuart noticed that the radial cowling over his port motor was coming adrift and feared a leak in the radiator of that motor.

The difference between the top speed of Priestley's aeroplane and that of Griffiths's aeroplane is 17 m.p.h. less than the minimum speed of Griffiths's aeroplane.

Priestley descended from his machine by way of the underneath gun position behind the wings after landing.

What did each fly?

SOLUTION TO MENTAL AEROBATICS IV—Lockheed Hudson.

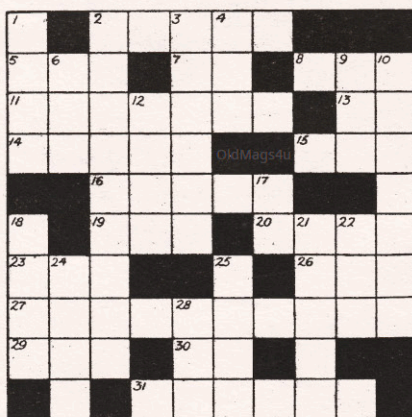
Clues Across

2. Surveys and trains for the R.A.F.
5. Unwrought metal.
7. Famous for his w.p.b.
8. Half of an old air liner still flying.
11. Greater than a Hurricane.
13. Not a specialist aeroplane.
14. Detached.
15. Personality.
16. Evidence.
19. Add "icon" to make a dictionary.
20. A form of help.
23. American ejaculation now ferrying.
26. Debt indicated.
27. A bombed city or a new British bomber?
29. Prefix.
30. With MS would go free.
31. Now performing in the Mediterranean.

Clues Down

1. One of these can jump.
2. Part of "The Spotter."

An Aeronautical Crossword

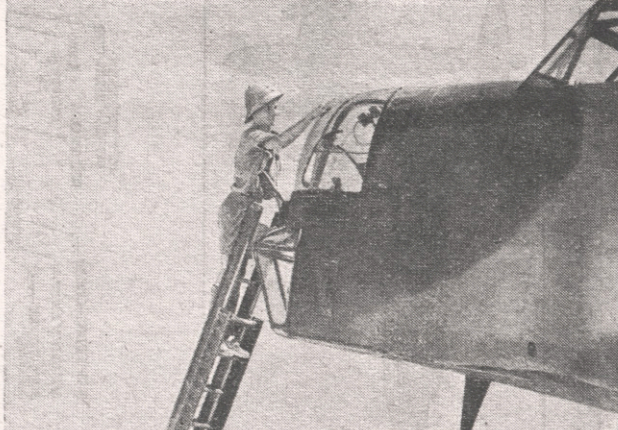


3. A nautical Fairey.
4. Queer.
9. Walrus motor nacelle is this shape.
10. For the Alert.
12. A naval command.
17. Fanny Adams.
18. Most seaplane bases have one.
21. New and Perseus-powered.
22. Not a quadrantal point.
24. Excludes useful load.
25. Drives like blazes.
28. Mercury well up the tube.

LAST WEEK'S CROSSWORD

Across:—1, Wellington. 6, Awl. 8, Irvin-suit. 11, Etc. 12, Hat. 14, Longeron. 16, NE. 17, Designs. 19, Yes. 21, Secret. 22, Spars. 25, Saro. 26, Keels. 28, Hector. 30, RE. 31, ENE. 32, Tornado.

Down:—1, Whitley. 2, Livingstone. 3, Glucose. 4, Oath. 5, NW. 7, Latest. 9, Need. 10, Stress. 13, Annealed. 15, Niche. 18, GR. 20, Essen. 23, Art. 24, Root. 27, Era. 28, HE. 29, Ro.



WHERE AND WHAT—Two more posers to test detailed knowledge. The problems last week were (left) the undercarriage of a H.P. Hampden and (right) the wing tip of a Consolidated Catalina flying-boat.